Nesom, G.L. and T.K. Lowrey. 2011. *Solidago capulinensis* (Asteraceae: Astereae) redivivus. Phytoneuron 2011-24: 1–22.

SOLIDAGO CAPULINENSIS (ASTERACEAE: ASTEREAE) REDIVIVUS

GUY L. NESOM
2925 Hartwood Drive
Fort Worth, TX 76109
www.guynesom.com

TIMOTHY K. LOWREY
Museum of Southwestern Biology
University of New Mexico
Albuquerque, NM 87131-0001

ABSTRACT

Solidago capulinensis Cockerell & Andrews is recollected from among basalt boulders at the base of Capulin Mountain in northeastern New Mexico and confirmed as an apparently distinct species. It also has been collected once in nearby Las Animas County, Colorado. It was described as a new species in 1936 from Capulin Mountain but apparently had not subsequently been seen or collected, nor has it been included in any account of the New Mexico or USA flora. It was sold in the Colorado nursery trade, however, from the 1930's until around the 1970's, and identification of a population in cultivation at the Pueblo Nature Center in Pueblo, Colorado, provided the incentive for a search in its natural habit. Plants of *S. capulinensis* are densely leafy subshrubs up to more than a meter tall, with numerous, ascending-erect, woody stems arising from the base and produce a greatly extended thyrsoid capitulescence, toothed leaves, and stipitate-glandular vestiture in the capitulescence. *Solidago capulinensis* is hypothesized to be most closely related to and perhaps derived from *S. wrightii* of *Solidago* subsect. *Thyrsiflorae*.
KEY WORDS: *Solidago capulinensis*, *S. wrightii*, Astereae, New Mexico

Solidago capulinensis Cockerell & Andrews was described in 1936 based on a collection from Capulin Mountain in northeastern New Mexico, but it has not been included in any subsequent account of the New Mexico or USA flora, even as a synonym (Martin & Hutchins 1981; Keller 1999; Allred 2008; Semple & Cook 2006), perhaps because it has been represented only by the type collection. Remarkably, however, a collection of the species was among western USA Asteraceae received by Nesom in 2000 for identification from Bob King and Bob Garvey, who collected it in the area of the Pueblo Nature Center in Pueblo, Colorado, along the Arkansas River about 110 miles north-northwest of Capulin Mountain.

The Nature Center plants were recognized as distinct, possibly an undescribed species, and Nesom arranged to meet King and Garvey (in September 2001) for further reconnaissance of the area where they made the collection. After a unsuccessful search in natural habitats on the shrubby hills and riparian areas around the Nature Center, about 15 large plants of the goldenrod were finally discovered to be cultivated along a walkway near the Visitor Center — King then recalling that indeed he had made his earlier collection from those cultivated plants (photos of the Nature Center plants: Figs. 7–9).

Even with good representative samples in hand, however, the plants remained unidentified for nearly another year, until browsing through the online type collection of the New York Botanical Garden led to the serendipitous recognition that the type of *Solidago capulinensis* was a match to the Nature Center plants.

A search in September 2010 at the type locality at Capulin Mountain shows the plants still grow there in abundance (Figs. 10–15), perhaps even at the exact spot where first collected by Andrews. Observations at the Pueblo Nature Center in August 2010 showed the plants of *Solidago capulinensis* to be there still, as seen in 2000 and 2001, but reduced to few in number.

Solidago capulinensis T.D.A. Cockerell & D.M. Andrews, Torreya 36: 35. 1936. **TYPE: USA. New Mexico**. [Union Co.:] Mt. Capulin National Monument, [18 Aug 1930, *D.M. Andrews s.n.*] (presumed holotype: NY!, internet image!, Fig. 2 of present report). From the protologue (p. 35): "The plant described below was found in some abundance by D.M. Andrews on rocky slopes of Mount Capulin National Monument, New Mexico, where it appeared to favor the driest positions. When transferred to the moister garden it retained essentially its natural habit, but the inflorescence became somewhat more ample in its branching."

There is no specimen of *Solidago capulinensis* at RM, where Andrews sent some specimens for identification by Aven Nelson (see RM Database 2010). Nor is there one identified as a type at COLO (COLO Type Database 2010) of the University of Colorado, Boulder, where Cockerell was on the faculty until 1934.

"Perhaps Cockerell sent the specimen to NY because of the Rydberg connection [Rydberg published floras of the Rocky Mountain region]. There is a catalog of his [Cockerell's] correspondence published by the archive, but only one letter from Rydberg in 1902. I don't know of any other specimens he sent there. As far as I know, there never was a 'Cockerell Herbarium.' The specimen is a fine one, certainly not Cockerell's style, which was usually a folded butterfly triangle" (fide W.A. Weber, pers. comm., 14 Sep 2010).

Plants perennial herbs. **Stems** ascending-erect from the base, (4–)8–12 dm tall, arising from a woody caudex, branching at least on distal half, upper stems green, 4 mm in diameter, the primary axis of the capitulescence 2–3 mm in diameter, upper stems moderately puberulent, glabrescent on older portions. **Leaves** densely arranged on the stems, relatively even-sized up to the capitulescence, elliptic-lanceolate to elliptic oblanceolate, net-veined, with 3–6 major lateral veins and a dark-colored reticulum, mostly 4–7 cm long, 12–20 mm wide, smaller into the capitulescence, basally attenuate to a subpetiolate portion 2–3 mm long, ca. 1 mm wide, not clasping, margins shallowly crenate serrate from base to tip, densely short-ciliate, flat (not revolute), thick-textured, gray-green, puberulent with arching-erect, non-glandular hairs, minutely stipitate-glandular on both surfaces. **Capitulescence** a complex cylindric-conic to pyramidal thyrse 25–40 cm long, 15–30(–35) cm wide, not at all secund, formed at the ends of major branches from an axis and spreading-ascending lateral branches, heads usually in short, subcylindric-paniculate branches; peduncles bracteate. **Capitula** turbinate-campanulate, 3–5 mm wide (pressed); phyllaries in 4–5 graduate series, lanceolate to oblong-lanceolate, apically acute, appressed, mostly 1 mm wide, slightly keeled, with a single orange-resinous midvein, inner 5.5–6 mm long, outer ca. 1/2 as long as the inner, middle phyllaries with a green patch on the distal 1/3–1/2, white-indurate below the green, innermost white-indurate (without a green patch), outermost mostly green, all sparsely puberulent, all moderately to densely minutely stipitate-glandular and resinous. **Ray florets** 11–15, pistillate, fertile, corollas yellow, erect, 5–7 mm long, 1–1.2 mm wide, tube 1–1.4 mm long; style 4–4.5 mm long. **Disc florets** 14–15, bisexual, fertile, corollas yellow, with orange-resinous nerves, glabrous, tubular-funnelform, 5–6 mm long, lobes 2.6–3 mm long, linear-lanceolate; filaments inserted 1 mm above base of corolla tube; style branches with lanceolate collecting appendages 1 mm long. **Achenes** fusiform-cylindric, 2.5–3 mm long, 0.5–0.8 mm wide, completely glabrous, with 11–14 slightly raised, resinous nerves; pappus a single series of 34–40 apically acute barbellate bristles.

Additional collections examined. **USA. Colorado. Las Animas Co.**: Mesa de Maya Region of southeastern Colorado, T34S R55W, NE 1/4 of Sec. 34, Cobert Mesa North Quad, growing in crevices of sandstone rocks in dry creekbed at the bottom of Gotera Canyon with *Melilotus alba*, ca.

5300 ft, 5 Aug 1993, *Dina Clark 238* and Penny Deihl (COLO). **Pueblo Co.**: Pueblo Nature Center, along the Arkansas River, ca. 2 mi W of city of Pueblo, row of ca. 10–15 plants, cultivated, at base of slope along paved trail, 38° 16.23" N, 104° 40.64" W, 4670 ft elev., 29 Sep 2001, *King 12006* with Nesom and Garvey (BRIT, COLO; also BRY, NY, and US fide King). Pueblo Nature Center, few plants in garden on east side of buildings and scattered plantings on the west side, 4 Aug 2010, *Nesom 2010-23* (COLO, NY, RM, UNM, WAT). A duplicate of the original collection from 2 September 2000 (*King & Garvey 11561*) is at BRIT; others presumably were distributed by King.

The primary author of the report and description of *Soldago capulinensis* was Theodore Cockerell (1866-1948), Professor of Zoology and Entomology at the University of Colorado in Boulder from 1904 until his retirement in 1934 (Weber 2000). Cockerell's specialty was zoology but he also was interested in plants and his analysis of the new species and its putative relatives was insightful. He noted that the "inflorescence resembles *S. oreophila*" [= *S. wrightii*] and "In Rydberg's Flora of the Prairies and Plains it clearly falls in the Speciosae, and apparently nearest to *S. lindheimeriana*" [= *S. petiolaris*]. His observations that "In Rydberg's key (Flora of Rocky Mountains), it runs nearest to *S. concinna* Nels." [= *S. multiradiata* Aiton, subsect. *Solidago*] and that "Our plant may be a western derivative of *S. puberula* Nuttall [of the eastern USA, subsect. *Albigula* (Raf.) Nesom], with shorter, less acute phyllaries and rough stem" emphasized the similarities in their thyrsoid capitulescences.

Solidago capulinensis is placed here as a member of *Solidago* subsect. *Thyrsiflorae* (A. Gray) A.Gray (sensu Nesom 1993; Semple & Cook 2006), which includes *S. petiolaris* Ait., *S. wrightii* A. Gray, *S. speciosa* Nutt, *S. buckleyi* Torr. & Gray, and the Mexican species *S. hintoniorum* Nesom and *S. orientalis* (Nesom) Nesom. Diagnostic features of subsect. *Thyrsiflorae* are a thyrsoid capitulescence, stipitate-glandular vestiture in the capitulescence, glabrous achenes, distinctly thickened, nearly sessile leaves, and quickly deciduous basal leaves. Species of this group have been included in recent studies (Taylor & Taylor 1984; Nesom 1993, 2008; Semple & Cook 2006).

Capulin Mountain is about 80 miles west of the westernmost populations of *Solidago petiolaris* (Fig. 1 of Nesom 2008; these plants are *S. petiolaris* var. *wardii*) and at the northern end of the range of *S. wrightii* (Fig. 1, present paper), the two closest relatives of *S. capulinensis*. *Solidago capulinensis* and *S. wrightii* (Figs. 4 and 5) are similar in their caespitose habit from thick, woody, non-rhizomatous bases, puberulent cauline vestiture, and glandular leaves. *Solidago capulinensis* is distinct from all species of subsect. *Thyrsiflorae* in its combination of large stature, large, leafy capitulescence (Figs. 2, 8, and 13–14), and relatively long disc corollas. Pertinent comparisons are given below.

1. Capitulescence a cylindric-conic to pyramidal, complex-branched panicle, heads usually in short, subcylindric-paniculate branches; disc florets 5–6 mm long, lobes 2.6–3 mm long [plants caespitose from thick, woody bases, not rhizomatous; leaves sparsely puberulent and glandular, involucres sparsely puberulent and densely glandular; achenes glabrous] ..... **Solidago capulinensis**
1. Capitulescence a flat-topped or broadly rounded corymboid cluster of short, cylindric-paniculate branches, or a subcylindric to subracemoid panicle; disc florets 3–5 mm long, lobes 1–2 mm long.

2. Plants caespitose from thick, woody bases, not rhizomatous; stems usually puberulent at least distally; uppermost leaves and involucres often minutely glandular (lens); inflorescence a more or less flat-topped, broadly rounded, or open, paniculate corymboid cluster of short, cylindric-paniculate branches, sometimes a subcylindric to subracemoid panicle; achenes strigose, rarely glabrous (in var. *guadalupensis* Nesom) ..... **Solidago wrightii**

2. Plants from a short caudex, often with a thickened, primary rhizome (commonly not evident in collections), production of scale-leaved rhizomes sometimes evident; stems glabrous to sparsely puberulent; leaves and involucres eglandular; inflorescence usually a subcylindric to subracemoid panicle; achenes glabrous or sparsely strigose at the summit ..... **Solidago petiolaris** var. **wardii**

Solidago petiolaris is generally distinct from *S. wrightii* in its combination of cylindric capitulescence, eglandular leaves, and glabrous or glabrate achenes, but vestiture and capitulescence shape vary in *S. wrightii* and no single character besides habit provides consistently diagnostic distinction between the two taxa. *Solidago wrightii* varies in vestiture from eglandular to densely stipitate-glandular, and while its capitulescence characteristically is cymoid, capitulescence branches less commonly are produced as narrow subcylindric panicles like those of *S. capulinensis*. *Solidago petiolaris* has eglandular leaves and phyllaries in its western range (= var. *wardii* (Britt.) Fern.) are eglandular and finely strigose, distinctly different from the glandular ones of *S. capulinensis* and *S. wrightii*; phyllaries of more eastern plants of *S. petiolaris* (= var. *angusta* (Torr. & Gray) A. Gray), however, are glandular and without other vestiture.

Solidago capulinensis resembles *S. speciosa* in its large capitulescence but the shorter plants with persistent basal leaves, smaller involucres, and glabrous phyllaries of the latter appear to remove it from consideration as a close relative. The populations of *S. speciosa* in Colorado and New Mexico are var. *pallida* (Porter) Semple.

It is not difficult, morphologically or geographically, to conceive of *Solidago capulinensis* as an evolutionary derivative of *S. wrightii*, perhaps as a gigas variant (a polyploid?), on the basis of its large stature, elaborated capitulescence, and larger florets. On the other hand, *S. wrightii* and *S. petiolaris* are parallel in trends of variability and *S. capulinensis* may be a relict of ancestral stock basal to both *S. wrightii* and *S. petiolaris*. In any case, *S. capulinensis* is distinct from both and appears to be fully fertile.

Capulin Mountain (Fig. 16) is in the Raton-Clayton Volcanic Field, which covers about 8000 square miles in northeastern New Mexico (Union and Colfax counties) and southeastern Colorado (Las Animas County). The single Colorado specimen of *Solidago capulinensis* that we have seen from Las Animas County suggests that it will be found in additional localities in this area. Lowrey, however, studied seven COLO collections of *S. wrightii* from southeastern Colorado (Baca and Las Animas counties) and identified all except the single collection as typical *S. wrightii*. The Mesa de Maya area needs to be carefully explored, since both species apparently occur there.

Typification of *Solidago wrightii*.

Blake (1929) concluded that *Wright 281* was the type of *Solidago wrightii*, but he did not specify which of the duplicates he was referring to: "From the name given and the first cited reference and collection it is evident that *Wright 281*, the plant on which the mention in 'Plantae Wrightianae' was based, is properly to be taken as type of the species." Nesom (2008) designated a GH collection as the lectotype.

Solidago wrightii A. Gray, Proc. Amer. Acad. Arts 16: 80. 1881. *Solidago bigelovii* var. *wrightii* (A. Gray) A. Gray, Proc. Amer. Acad. Arts 17:190. 1882. **LECTOTYPE** (Nesom 2008): U.S.A. New Mexico, "collected in expedition from western Texas to El Paso, New Mexico, May-Oct 1849, *C. Wright 281* (GH 269073!; isolectotype: US, internet image!, reproduced here as Fig. 3). From Wright's field notes, the type collection probably was made at the southern end of the Davis Mountains in Jeff Davis Co., Texas (see discussion in Nesom 2008). The GH specimen is mounted with non-type specimens of *Wright s.n.*, field #507, 1st coll. 1851 (GH 269074, and *Bigelow 504c* (GH 269075).

How did *Solidago capulinensis* reach Colorado?

No one at the Pueblo Nature Center can recall the origin of the plantings, but *Solidago capulinensis* is beautiful in cultivation and, in fact, the original collector was a horticulturalist and surely was drawn to the plants for that reason. Darwin M. Andrews (1869-1938) owned and operated the Rockmont Nursery in Boulder, Colorado, and was interested in cacti, yuccas, conifers, alpine plants, and a range of perennial herbs. Andrews brought native species from Colorado and the region into cultivation for home gardens (Ewan 1950). His scientific bent also resulted in collections of fungi (Shope 1929). In addition to the native species, he also sold trees and shrubs from the Midwest and from Europe. The Andrews Arboretum in Boulder is named for him (City of Boulder 2010).

The 1938 catalog (and perhaps others slightly earlier) from Rockmont Nursery includes an entry for the Capulin Goldenrod, *Solidago 'capulensis'* (Fig. 14) and presumably it may be established as a cultivar in various places in Colorado from this original stock. It is almost certain that the individuals of *Solidago capulinensis* originally planted at the Pueblo Nature Center were purchased through a horticultural source, but the species is apparently now no longer in the trade. A telephone survey in August 2010 of 14 native plant nurseries in Boulder, Denver, and Pueblo, Colorado, found no sources of the species and no one who had even heard of the Capulin goldenrod.

Although *Solidago capulinensis* may be discovered in additional Colorado plantings, it has not been recorded as native or naturalized in the state (e.g., Harrington 1954; Weber & Wittmann 1994, 1996; Hartman & Nelson 2001). Dr. William Weber, who received a duplicate of the Nature Center collection from 2000 (*King & Garvey 11561*), did not recognize it as a species native or naturalized in Colorado (fide Bob King, pers. comm. 2001), though he did annotate it 2001 as *Solidago wrightii*.

ACKNOWLEDGMENTS

We are grateful to the staff at NY for hospitality during recent study (Nesom) there, Bill Adams, Master Naturalist, for photos and observations (3 Sep 2010) on the flowering goldenrods at the Pueblo Nature Center, John Semple and Jerry Oldenettel for photos of *Solidago wrightii*, staff of GH for a loan (to MO) of the type of *Solidago wrightii*, staff of COLO for a loan to UNM of Colorado *Solidago*, Bill Weber for comments on T.D.A. Cockerell and the path of the type specimen of *Solidago capulinensis*, and the staff at Capulin Volcano National Monument for a collecting permit (Lowrey).

LITERATURE CITED

Allred, K.W. 2008. Flora Neomexicana I: The vascular plants of New Mexico. An annotated checklist to the names of vascular plants with synonymy and bibliography. Lulu.com.

Blake, S.F. 1929. New Asteraceae from the United States, Mexico, and Honduras. J. Wash. Acad. Sci. 19: 268–282.

City of Boulder. 2010. The Andrews Arboretum, Boulder Parks and Recreation, Urban Forestry Section. Boulder, Colorado. <http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=3849&Itemid=90>

Cockerell, T.D.A. and D.M. Andrews. 1936. A new goldenrod from northern New Mexico. Torreya 36: 35–36.

COLO Type Database. 2010. Type Specimen Database of the University of Colorado Herbarium. Univ. of Colorado Museum of Natural History, Boulder. <http://cumuseum.colorado.edu/Research/Botany/Databases/search.php>

Ewan, J. 1950. Rocky Mountain Naturalists. Univ. of Denver Press, Denver, Colorado.

Harrington, H.D. 1954. Manual of the Plants of Colorado. Sage Books, Denver, Colorado.

Hartman, R.L. and B.E. Nelson. 2001. A checklist of the vascular plants of Colorado. Rocky Mountain Herbarium, Univ. of Wyoming, Cheyenne.

<http://www.rmh.uwyo.edu/ data/co_checklist.pdf>
Keller, C.F. 1999. New Mexico *Solidagos*: A preliminary look at a difficult problem, with a tentative key. New Mexico Botanist Newsl. 11. <http://web.nmsu.edu/~kallred/herbweb/newpage3.htm>
Martin, W.C. and C.R. Hutchins. 1981. A Flora of New Mexico. Vols. 1 and 2. J. Cramer, Vaduz.
Nesom, G.L. 1993. Taxonomic infrastructure of *Solidago* and *Oligoneuron* (Asteraceae: Astereae) and comments on their phylogenetic position. Phytologia 75: 1–44.
Nesom, G.L. 2008. Taxonomic review of *Solidago petiolaris* and *S. wrightii* (Asteraceae: Astereae). Phytologia 90: 21–35.
RM Database. 2010. RM Herbarium Specimen Database. Univ. of Wyoming, Laramie. <http://www.rmh.uwyo.edu/data/search.php>
Semple, J.C. and R.E. Cook. 2006. *Solidago* (Asteraceae: Astereae). Pp. 107–166, *in* Flora of North America North of Mexico, Vol. 20. Oxford Univ. Press, New York and Oxford.
Shope, P.F. 1929. History of mycological collectors in Colorado. Mycologia 21: 292–296.
Taylor, C.S. and R.J. Taylor. 1984. *Solidago* (Asteraceae) in Oklahoma and Texas. Sida 10: 223-251.
Trimble, D.E. 1980. The geologic story of the Great Plains: A nontechnical description of the origin and evolution of the landscape of the Great Plains. U.S. Geological Survey Bulletin 1493. <http://www.nps.gov/history/history/online_books/geology/publications/bul/1493/index.htm>
Weber, W.A. 2000. The American Cockerell: A Naturalist's Life, 1860-1948. Univ. Press of Colorado, Niwot.
Weber, W.A. and R.C. Wittmann. 1994. Catalog of the Colorado flora: A biodiversity baseline. Univ. Press of Colorado, Niwot, Colorado.
Weber, W.A. and R.C. Wittmann. 1996. Colorado flora: Eastern slope. Univ. Press of Colorado, Boulder, Colorado.

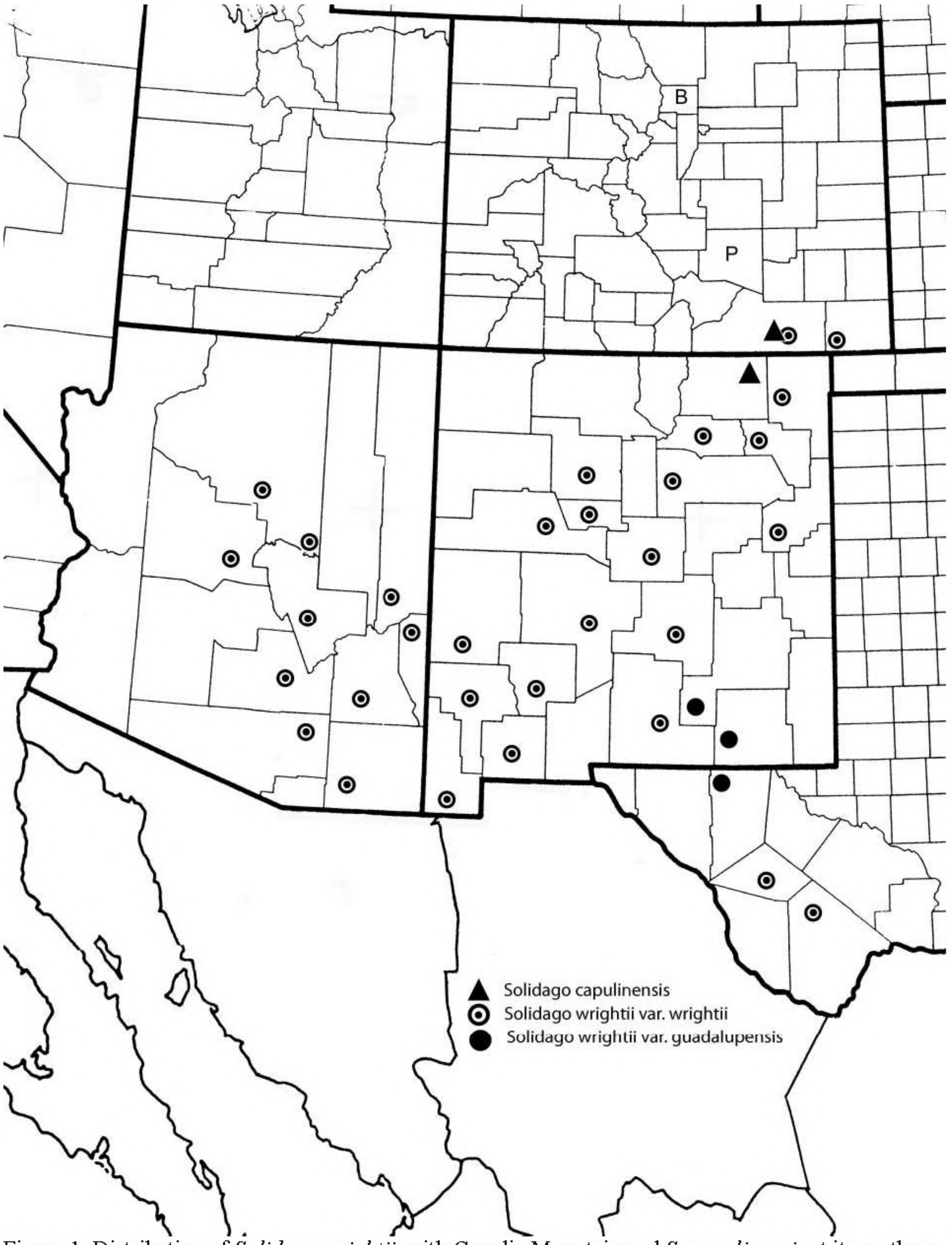


Figure 1. Distribution of *Solidago wrightii*, with Capulin Mountain and *S. capulinensis* at its northern extremity. The record for Baca County, Colorado, is added from the Specimen Database of Colorado Vascular Plants (COLO). B = Boulder. P = Pueblo. The distribution of *S. wrightii* continues southward into Mexico.

Figure 2. Holotype of *Solidago capulinensis* (NY).

Figure 3. Isotype of *Solidago wrightii* (US).

Figure 4. *Solidago wrightii*, at Axel Bend on Sierra Blanca, Lincoln Co., New Mexico. Photo by Jerry Oldenettel, 19 August 2007.

Figure 5. *Solidago wrighti* (*Semple & Heard 7930*) in Arizona. Photo by John Semple.

Figure 6. Cultivated plant of *Solidago capulinensis* at the Pueblo Nature Center. In bud but not yet in flower. Photo by Nesom, 3 August 2010.

Figure 7. Cultivated plant of *Solidago capulinensis* at the Pueblo Nature Center, same as in Fig. 5. Photo by Bill Adams, 3 September 2010.

Figure 8. Branch of cultivated *Solidago capulinensis* at the Pueblo Nature Center. In bud but not yet in flower. Photo by Nesom, 3 August 2010.

Figure 9. Close-up of cultivated plant of *Solidago capulinensis* at the Pueblo Nature Center, same as in Figs. 5 and 6. Photo by Bill Adams, 3 September 2010.

Figure 10. *Solidago capulinensis* in natural habitat among basalt boulders, Capulin Volcano National Monument, Photo by Lowrey, 11 September 2010.

Figure 11. Habitat of *Solidago capulinensis* among basalt boulders, Capulin Volcano National Monument. Photo by Lowrey, 11 September 2010.

Figure 12. Habitat of *Solidago capulinensis*, hillside of basalt boulders at base of mountain, Capulin Volcano National Monument. Photo by Lowrey, 11 September 2010.

Figure 13. *Solidago capulinensis* capitulescence structure, Capulin Volcano National Monument. Photo by Lowrey, 11 September 2010.

Figure 14. *Solidago capulinensis* capitulescence structure, Capulin Volcano National Monument. Photo by Lowrey, 11 September 2010.

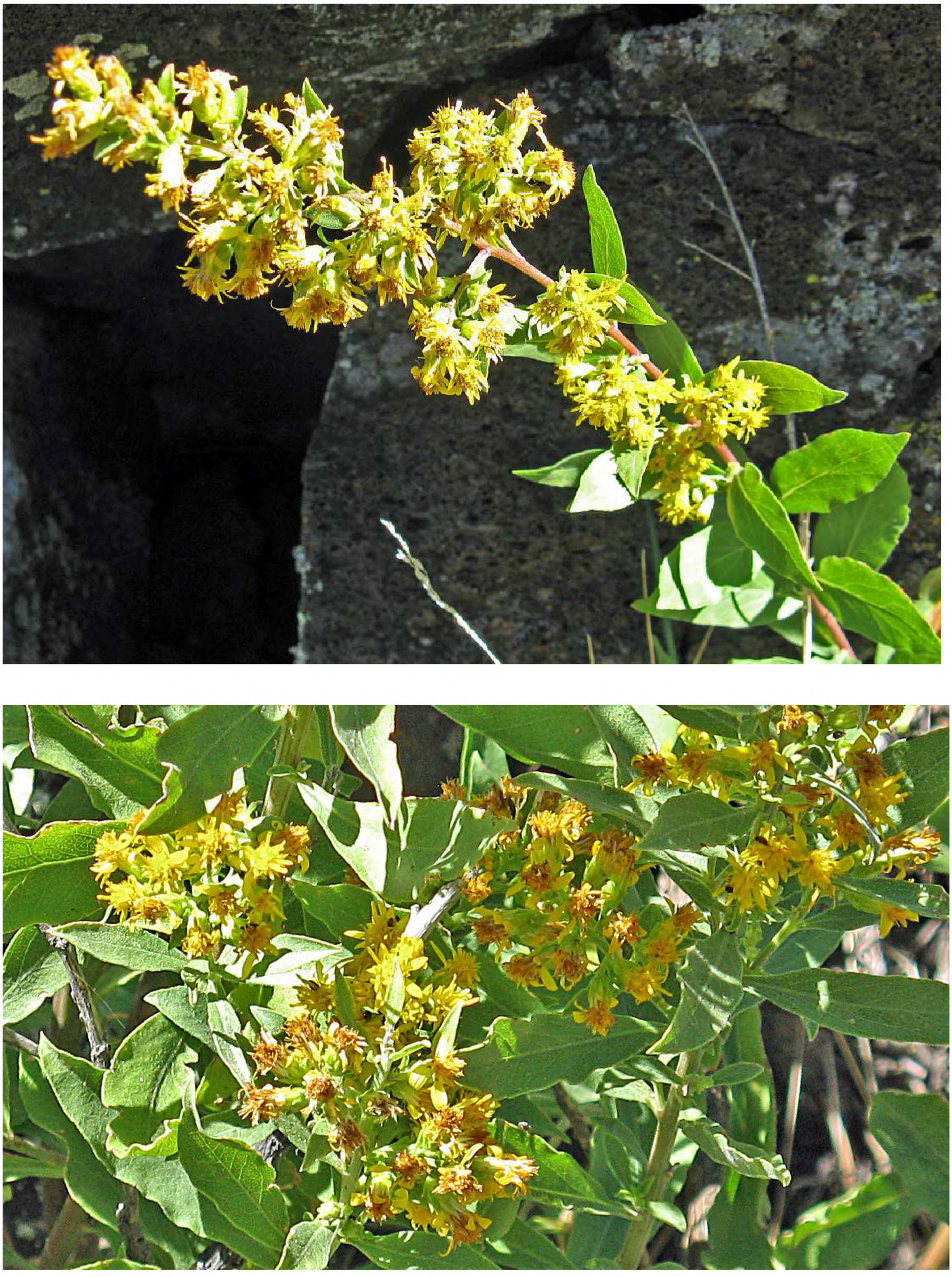
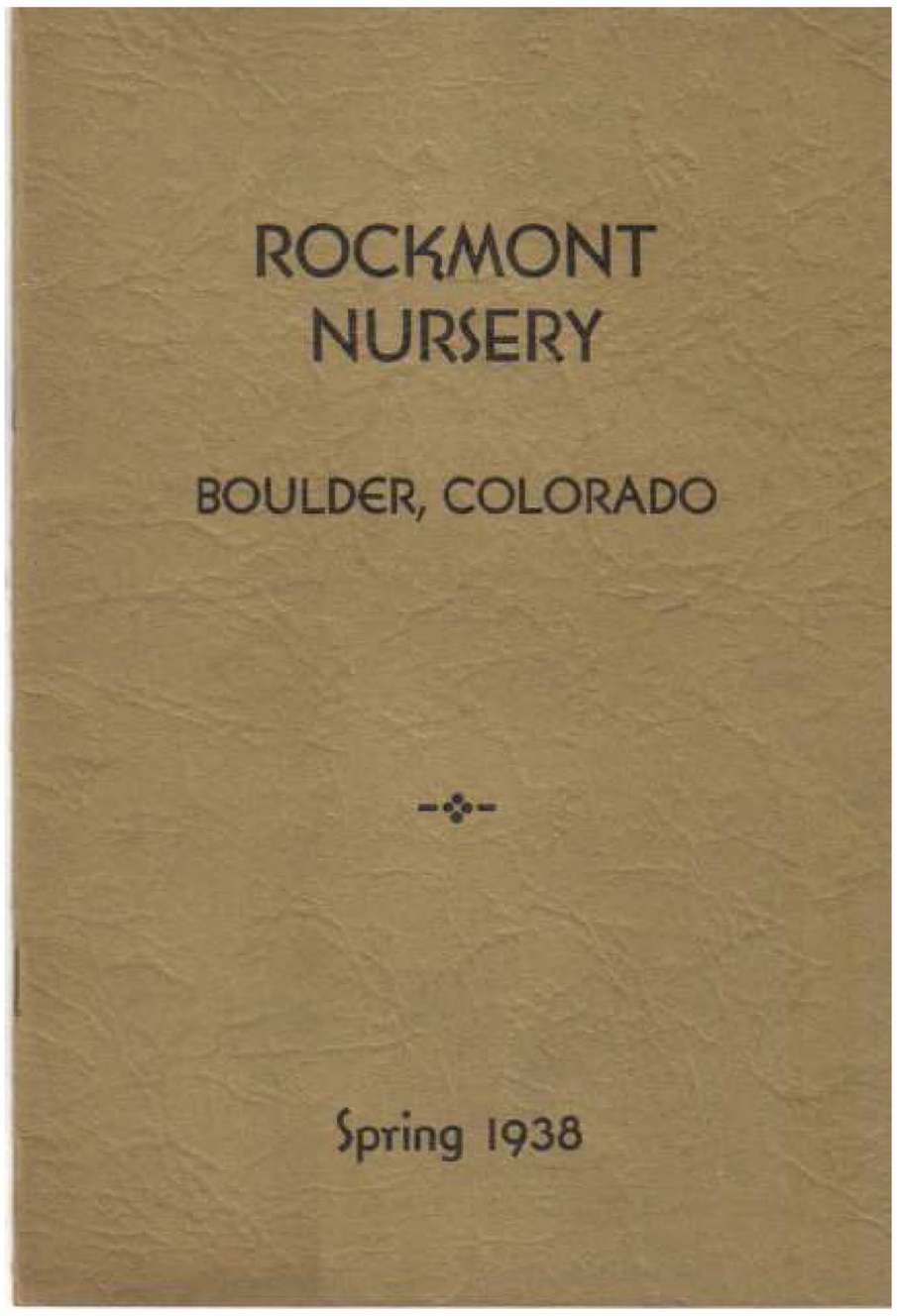
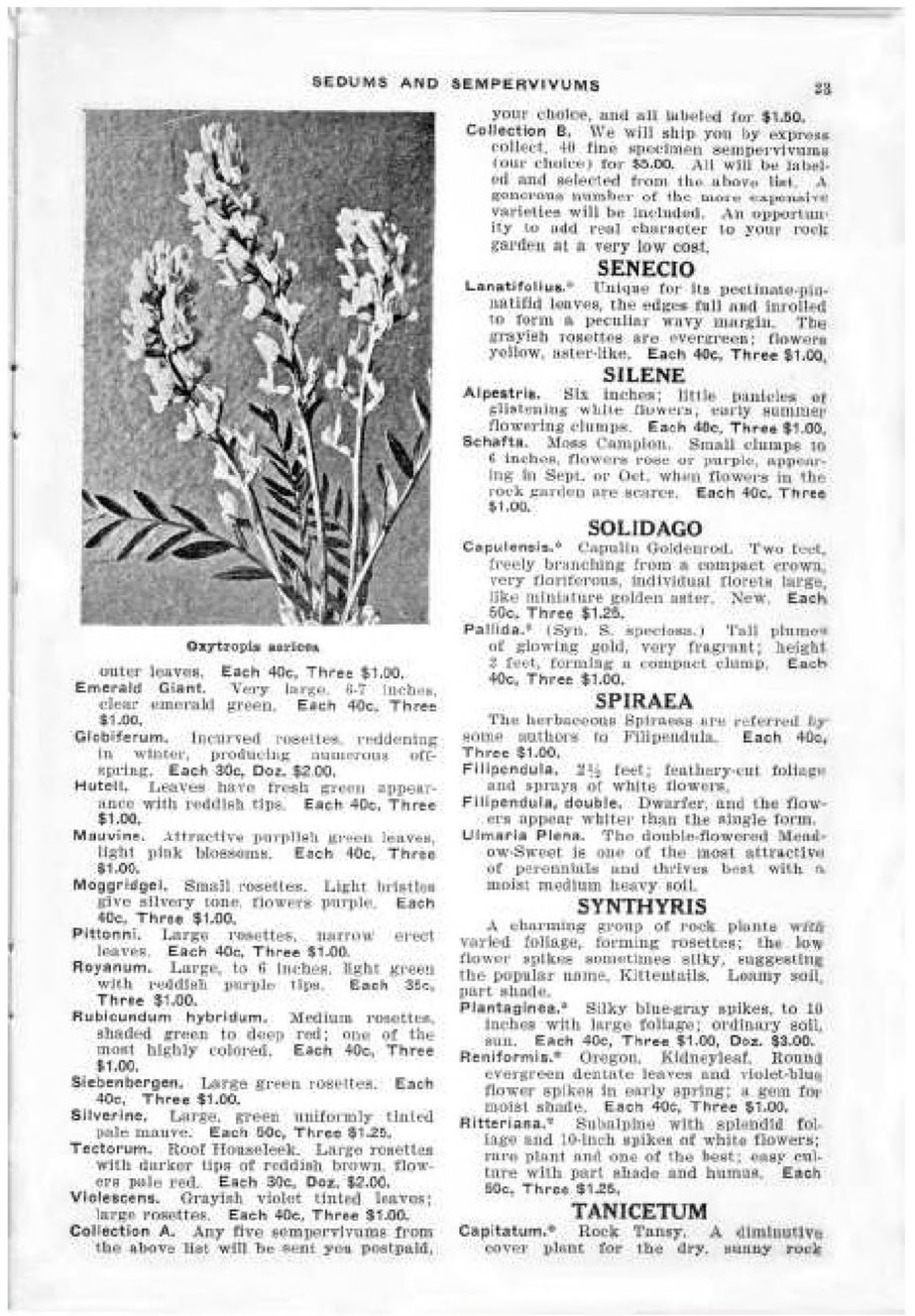


Figure 15 a, b. *Solidago capulinensis* at Capulin Volcano National Monument. Photos by Lowrey, 11 September 2010.

Figure 16. Capulin Volcano National Monument, New Mexico. Capulin Mountain, a huge cinder cone that erupted between 4,000 and 10,000 years ago, rises more than 1,000 feet above its base. Photo by R.D. Miller in Trimble (1980), U.S. Geological Survey, Dept. of the Interior.





SEDUMS AND SEMPERVIVUMS 23

Oxytropis sericea

outer leaves. Each 40c, Three $1.00.
Emerald Giant. Very large, 6-7 inches, clear emerald green. Each 40c, Three $1.00.
Globiferum. Incurved rosettes, reddening in winter, producing numerous offspring. Each 30c, Doz. $2.00.
Hutelt. Leaves have fresh green appearance with reddish tips. Each 40c, Three $1.00.
Mauvine. Attractive purplish green leaves, light pink blossoms. Each 40c, Three $1.00.
Moggridgei. Small rosettes. Light bristles give silvery tone, flowers purple. Each 40c, Three $1.00.
Pittonni. Large rosettes, narrow erect leaves. Each 40c, Three $1.00.
Royanum. Large, to 6 inches, light green with reddish purple tips. Each 35c, Three $1.00.
Rubicundum hybridum. Medium rosettes, shaded green to deep red; one of the most highly colored. Each 40c, Three $1.00.
Siebenbergen. Large green rosettes. Each 40c, Three $1.00.
Silverine. Large, green uniformly tinted pale mauve. Each 50c, Three $1.25.
Tectorum. Roof Houseleek. Large rosettes with darker tips of reddish brown, flowers pale red. Each 30c, Doz. $2.00.
Violescens. Grayish violet tinted leaves; large rosettes. Each 40c, Three $1.00.
Collection A. Any five sempervivums from the above list will be sent you postpaid, your choice, and all labeled for $1.50.
Collection B. We will ship you by express collect, 40 fine specimen sempervivums (our choice) for $5.00. All will be labeled and selected from the above list. A generous number of the more expensive varieties will be included. An opportunity to add real character to your rock garden at a very low cost.

SENECIO

Lanatifolius.* Unique for its pectinate-pinnatifid leaves, the edges full and inrolled to form a peculiar wavy margin. The grayish rosettes are evergreen; flowers yellow, aster-like. Each 40c, Three $1.00.

SILENE

Alpestris. Six inches; little panicles of glistening white flowers; early summer flowering clumps. Each 40c, Three $1.00.
Schafta. Moss Campion. Small clumps to 6 inches, flowers rose or purple, appearing in Sept. or Oct. when flowers in the rock garden are scarce. Each 40c, Three $1.00.

SOLIDAGO

Capulensis.* Capulin Goldenrod. Two feet, freely branching from a compact crown, very floriferous, individual florets large, like miniature golden aster. New. Each 50c, Three $1.25.
Pallida.* (Syn. S. speciosa.) Tall plumes of glowing gold, very fragrant; height 2 feet, forming a compact clump. Each 40c, Three $1.00.

SPIRAEA

The herbaceous Spiraeas are referred by some authors to Filipendula. Each 40c, Three $1.00.
Filipendula. 2½ feet; feathery-cut foliage and sprays of white flowers.
Filipendula, double. Dwarfer, and the flowers appear whiter than the single form.
Ulmaria Plena. The double-flowered Meadow-Sweet is one of the most attractive of perennials and thrives best with a moist medium heavy soil.

SYNTHYRIS

A charming group of rock plants with varied foliage, forming rosettes; the low flower spikes sometimes silky, suggesting the popular name, Kittentails. Loamy soil, part shade.
Plantaginea.* Silky blue-gray spikes, to 10 inches with large foliage; ordinary soil, sun. Each 40c, Three $1.00, Doz. $3.00.
Reniformis.* Oregon, Kidneyleaf. Round evergreen dentate leaves and violet-blue flower spikes in early spring; a gem for moist shade. Each 40c, Three $1.00.
Ritteriana.* Subalpine with splendid foliage and 10-inch spikes of white flowers; rare plant and one of the best; easy culture with part shade and humus. Each 50c, Three $1.25.

TANICETUM

Capitatum.* Rock Tansy. A diminutive cover plant for the dry, sunny rock

SOLIDAGO

Capulensis.* Capulin Goldenrod. Two feet, freely branching from a compact crown, very floriferous, individual florets large, like miniature golden aster. New. **Each 50c, Three $1.25.**

Pallida.* (Syn. S. speciosa.) Tall plumes of glowing gold, very fragrant; height 2 feet, forming a compact clump. **Each 40c, Three $1.00.**

Figure 17. Front cover and page 23 of the Spring 1938 Rockmont Nursery catalog, advertising the Capulin Goldenrod for sale. The excerpt is from the right-hand column of page 23 (shown above). The catalog notes that the asterisk "Indicates Colorado and other western species."